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Aquatic Hyphomycetes from Thailand

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Key Word Index—Aquatic Hyphomycetes; Thailand.

Summary

Aquatic Hyphomycetes have been collected from eight form-samples in Thailand. Twenty known species are recorded. In addition, twenty different types of conidia are illustrated which belong to unidentified species.

Since attention was first drawn to the aquatic spores in streams by Ingold (1942), the presence of spores of aquatic Hyphomycetes has been reported from various parts of the world. In November, 1981, Tubaki and Manoch made a brief survey of aquatic Hyphomycetes in streams near Bangkok, Thailand and found a number of the conidia of these fungi in form-samples.

Since it does not appear that there are any previous records of aquatic Hyphomycetes from Thailand, our brief observations may encourage others to make a detailed study on these organisms in Thailand.

Eight form-samples were collected by Manoch from streams in Chiang Mai and Kanchanabri, located in the northern and western parts of Thailand, on the 6–9th of April and the 17th of May, 1982, respectively, and these form-samples were fixed by formalin immediately after collection.

In Chiang Mai, the site of collections was a shallow stream running from a small waterfall by the roadside on a hill on the way to Doy Suthep, about 800 meters above sea level, in a natural stand of mixed deciduous forest dominated by *Lagerstroenia calyculata*, *Xylia kerria*, *Pterocarpus macrocarpus*, *Afzelia xylocarpa*, *Tectona grandis*, etc., with bamboo undergrowth. On the top of the hill, which is about 1,200 meters above sea level, is a natural stand of pine forest (*Pinus* spp.) along with dry evergreen forest dominated by

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Table 1. Occurrence of aquatic Hyphomycetes in two localities in Thailand.

Species	Localities		Illustration in Figure
	Chiang Mai	Kanchanabri	
Anguillospora gigantea Ranzoni (?)		+	1
A. longissima (de Wildeman) Ingold		+	39
Articulospora tetracladia Ingold	+		18
Brachiosphaera tropicalis Nawawi	+	++	4
Campylospora chaetocladia Ranzoni	+++	++	19
Campylospora sp.	+	+++	17
Clavariopsis aquatica de Wildeman	+++		29
Clavariopsis sp.		+	7
Clavatospora tentacula (Umphelett) S. Nillson	+	++	40
Dendrospora tenella Desc. & Webster		+	8
Flabellospora verticillata Alas.		+	12
Flabellospora sp. 1		+	9
Flabellospora sp. 2		+	14
Isthmotricladia gombakiensis Nawawi		+	10
I. laeensis Matsushima		+	32
Lemonniera cornuta Ranzoni		+	5
Lunnulospora curvula Ingold		++	36
L. cymbiformis Miura	+		20
Phalangispora constricta Nawawi	+		13
Scorpiosporium sp.		+++	22
Speiropsis irregularis Petersen		+	27
Tetracladium marchalianum de Wildeman	+		21
Trinacrium subtile Riess (?)		++	30
Tripospermum prolongatum Sinclair & Morgan-Jones		+	26
Tripospermum sp.		+	23
Triscelophorus acuminata Nawawi	+	+	3
Triscelophorus sp. 1	+++	+	31
Triscelophorus sp. 2		+	2
Triscelophorus sp. 3		++	34

+++: abundant, account for nearly 20–40% of all spores; ++: 1–10%; +: below 1%.

Castanopsis, *Quercus*, *Lithocarpus*, and *Dipterocarpus*.

In Kanchanabri, the site of collections was a shallow stream running from the mountain, which is 200 meters above sea level, flowing along one side of Lithi and orange orchids. The vegetation on that hilly mountain is a mixed deciduous forest consisting of *Lagerstroenia calyculata*, *Xylia kerria*, *Pterocarpus macrocarpus*, *Afzelia xylocarpus*, *Tectona grandis*, etc., with bamboo undergrowth.

The rainy season normally starts in June or July in Thailand; however, it was raining in Chiang Mai and Kanchanabri the day before the collections, so it is true that

a lot of fallen leaves and plant debris had been introduced into the streams at that time. The water temperature of the streams was 20C.

The fixed samples were then brought to the mycological laboratory of the Institute of Biological Sciences, University of Tsukuba, and were examined under a microscope.

Table 1 is a list of the aquatic Hyphomycetes and allied fungi found in these form-samples.

A noteworthy feature of the fungi encountered (Table 1) is that the conidia of *Campylospora chaetocladia* (Fig. 19), *Clavariopsis aquatica* (Fig. 29), and *Triscelophorus* sp. 1 (Fig. 31) were those most frequently found in Chiang Mai. They account for nearly two-thirds of all conidia. Among the conidia found in Kanchanabri, the most frequent were those of *Campylospora* sp. (Fig. 17) and *Scorpiosporium* sp. (Fig. 22). It is to be noted that six of the eleven species from Chiang Mai have been found in Kanchanabri. This may indicate that the aquatic conidia in Chiang Mai and Kanchanabri are fairly different; therefore, more detailed observations are needed to discuss the distribution of the aquatic Hyphomycetes in Thailand.

A number of conidia not referable to any described species occurred in the samples and some of them are worthy of a brief mention.

Conidia of *Anguillospora* (Fig. 1) found only in Kanchanabri closely approached those of *A. gigantea* Ranzoni in diameter; but were, however, different from the latter in having more septated conidia (up to 20 septa).

The conidia shown in Fig. 2, now temporally included in *Triscelophorus*, are also referable to the genus *Culcidospora* in the manner of branching of the arms. Conidia of *Triscelophorus acuminata* Nawawi (Fig. 3) are slightly smaller and less-septated than those of the original description. *Triscelophorus* sp. 1 (Fig. 31) probably belongs to an undescribed species.

Clavariopsis sp. (Fig. 7) is referable to the undescribed species reported from Jamaica by Hudson and Ingold (1960) in all respects. There is still a little doubt in placing this fungus in the genus because of a small projection from the base of the first arm already pointed out by above authors.

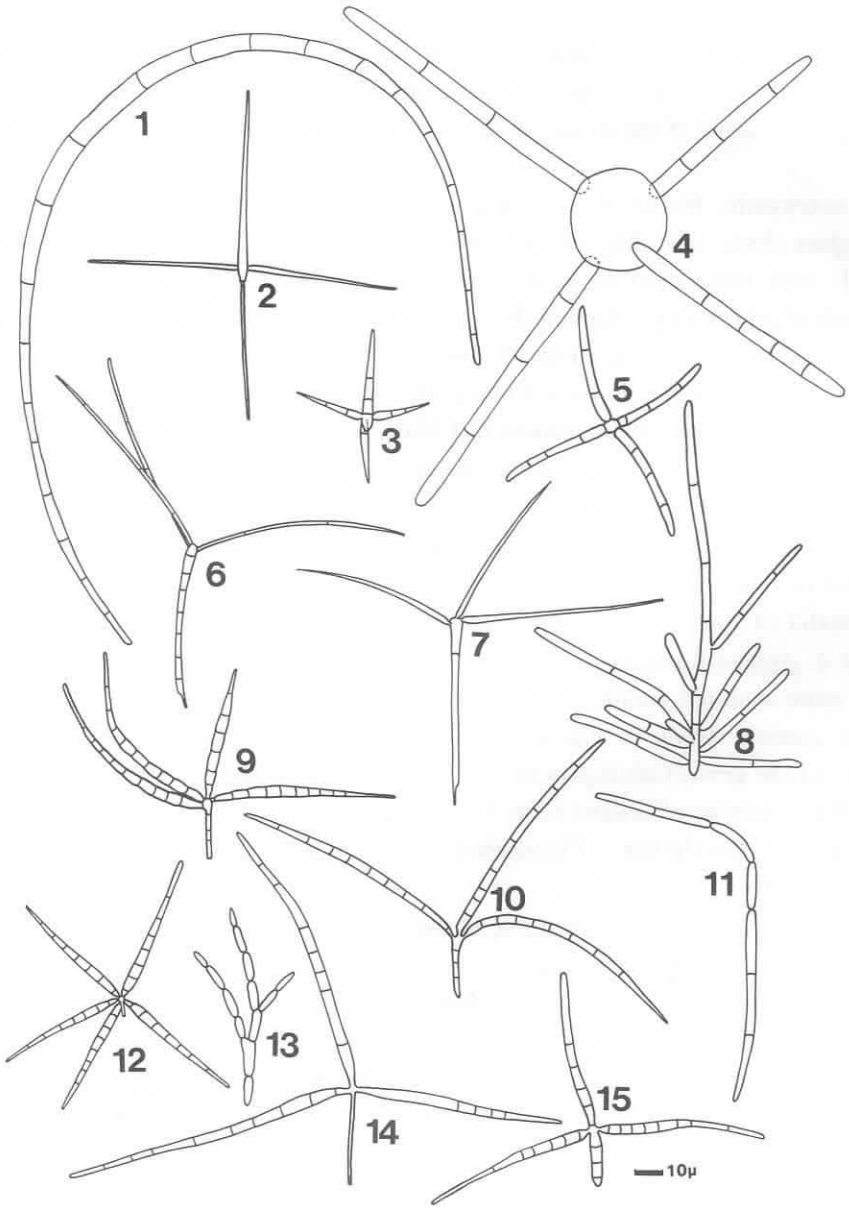
Campylospora sp. (Fig. 17) has much more delicate "hairs" than those of larger types such as *C. chaetocladia* (Fig. 19) and is very close to the unknown fungus described by Ingold (1959) from Nigeria.

Scorpiosporium sp. (Fig. 22) is close to *S. angulata* (Ingold) Iqbal except for the much septated arms.

One type of conidia of an unidentified fungus (Fig. 23) seems possibly to be a species of *Tripospermum* or *Dwayaangam*.

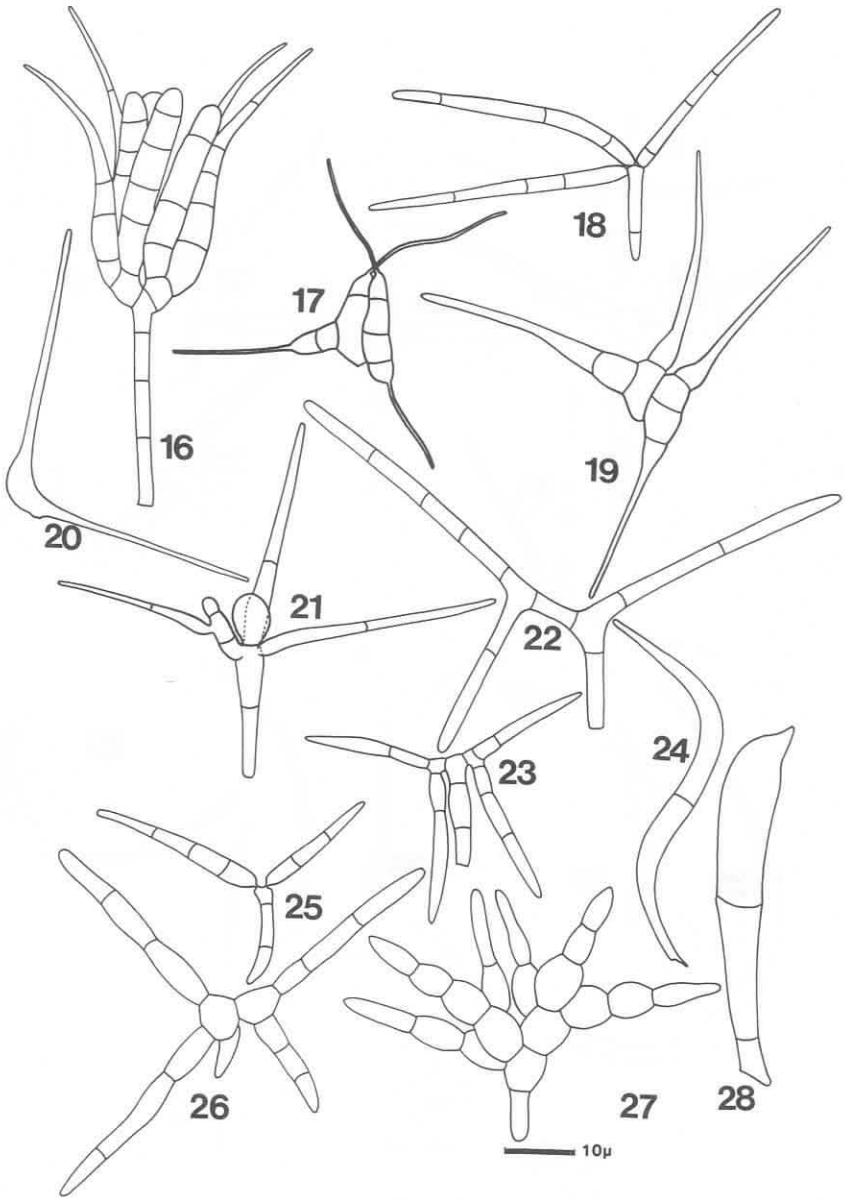
The conidium shown in Fig. 30 seems to agree closely with that of *Trinacrium subtile* Riess.

One unidentified fungus (Fig. 6) resembles *Clavariopsis* sp. (Fig. 7), but differs from



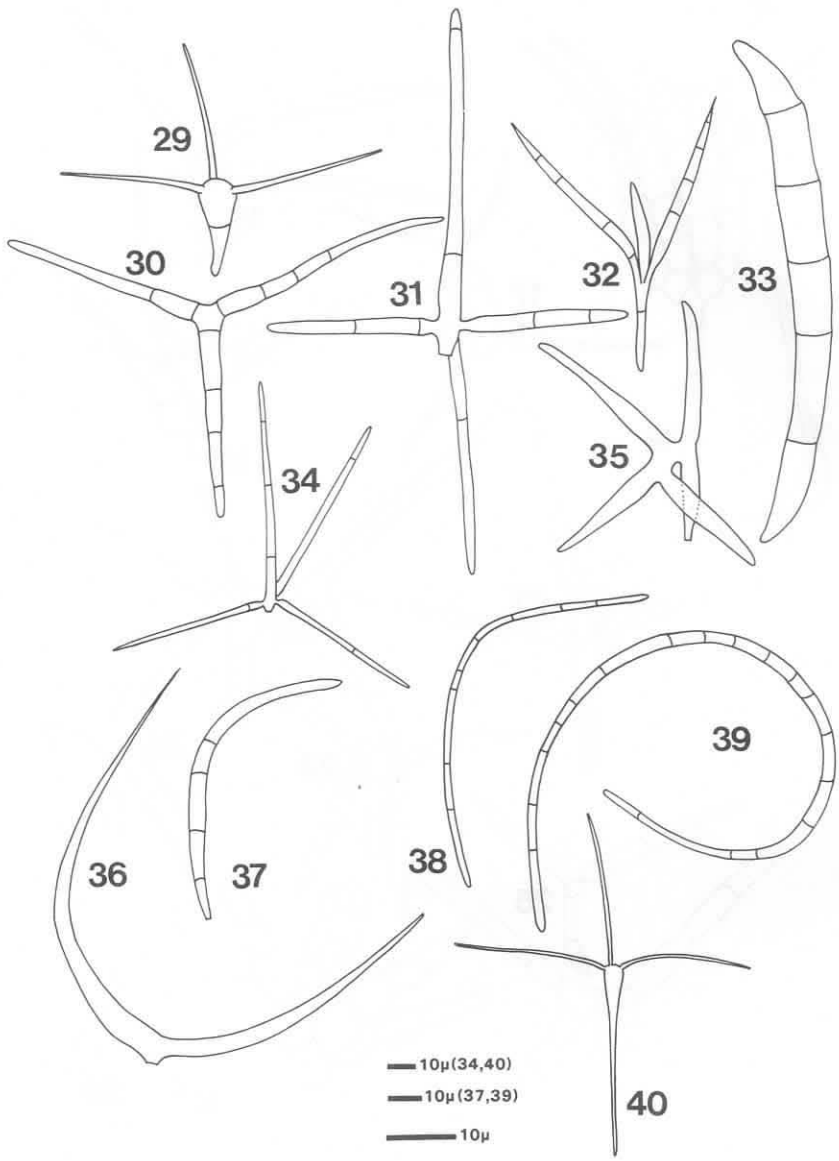
Figs. 1–15

Fig. 1. *Anguillospora gigantea* (?); 2. *Triscelophorus* sp. 2; 3. *Triscelophorus acuminata*; 4. *Brachiosphaera tropicalis*; 5. *Lemonniera cornuta*; 6. unidentified; 7. *Clavariopsis* sp.; 8. *Dendrospora tenella*; 9. *Flabellospora* sp. 1; 10. *Isthmotricladia gombakiensis*; 11. unidentified; 12. *Flabellospora verticillata*; 13. *Phalangispora constricta*; 14. *Flabellospora* sp. 2; 15. unidentified.



Figs. 16–28

Fig. 16. unidentified; 17. *Campylospora* sp.; 18. *Articulospora tetracladia*; 19. *Campylospora chaetocladia*; 20. *Lunnulospora cymbiformis*; 21. *Tetracladium marchalianum*; 22. *Scorpiosporium* sp.; 23. *Tripospermum* sp.; 24., 25. unidentified; 26. *Tripospermum prolongatum*; 27. *Speiropsis irregularis*; 28. unidentified.



Figs. 29–40

Fig. 29. *Clavariopsis aquatica*; 30. *Trinacrium subtile* (?); 31. *Triscelophorus* sp. 1; 32. *Isthmotricladia laeensis*; 33. unidentified; 34. *Triscelophorus* sp. 3; 35. unidentified; 36. *Lunnulospora curvula*; 37, 38. unidentified; 39. *Anguillospora longissima*; 40. *Clavatospora tentacula*.

the latter in its septated branches. Type 11 (Fig. 11) is close to the fungus illustrated by Miura (1974) as an unidentified fungus, No. 46. Type 15 (Fig. 15) seems to be a species of *Flabellospora*. Type 16 (Fig. 16) seems to be a species of *Tetracladium*, but differs from any known species of the genus. A worm-like conidium, Type 24 (Fig. 24), resembles an undescribed fungus, No. 45, illustrated by Miura (1974), but the conidia of our fungus are much smaller. Type 33 (Fig. 33) will probably be of *Fusarium*. The remainders, conidia of Type 25 (Fig. 25), 28 (Fig. 28), 35 (Fig. 35), 37 (Fig. 37), and 38 (Fig. 38), are unidentified; most of them will be of undescribed species.

A detailed comparison of the Thailand aquatic Hyphomycetes with those of neighboring countries is required but must be postponed until further study is done.

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摘　　要

タイ国産水生不完全菌類

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タイ国チェンマイおよびカンチャナブリ附近の渓流で採取した水泡から20種の水生不完全菌類を見出し，属まで同定した9種，未同定菌と合せて40種の分生子を図示した．タイ国産水生不完全菌として最初の報告である．

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